

## THE EFFECTS OF HIGH IODINE INTAKE ON PERCHLORATE-RELATED DECREASES IN THYROID HORMONE, NHANES 2001-2

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**Background:** Perchlorate is an oxidizing agent used to manufacture rocket fuel, munitions, and other products, and exposure in the U.S. is ubiquitous. Perchlorate inhibits iodide uptake into the thyroid and can decrease thyroid hormone production. Thyroid hormone is critical for proper neurodevelopment, and even small decreases in thyroid hormone during pregnancy have been linked with significant developmental effects in children. Recent evidence suggests that common environmental perchlorate exposures could decrease thyroid hormones in people with low iodine intake. This has led to the suggestion that all pregnant women should receive iodine supplementation. However, some data suggest that high iodine intake might also cause thyroid suppression.

**Methods:** Data from the 2001-2 National Health and Nutrition Examination Survey on serum thyroid hormones and urine perchlorate and iodine, and linear regression analyses, were used to assess whether previously observed perchlorate-related decreases in thyroid hormone might be greater in people with high iodine intakes.

**Results:** In women with urinary iodine <100 µg/L, a 10-fold increase in urinary perchlorate (about the 10<sup>th</sup> to the 90<sup>th</sup> percentile) was associated with an 11.4% decrease in serum thyroid hormone levels ( $p < 0.01$ ;  $n = 383$ ). In women with high urinary iodine (>95<sup>th</sup> percentile of 600 µg/L) the effect was 3-times greater. That is, a 10-fold increase in urinary perchlorate was associated with a 34.7% decrease in serum thyroid hormone levels ( $p = 0.02$ ;  $n = 53$ ). No clear effect was seen in women with moderate urinary iodine levels (100-600 µg/L).

**Conclusions:** These data provide some indication that high iodine intake might worsen the thyroid effects of perchlorate. Although the sample size was small, the finding in the high iodine group is consistent with other studies in high iodine populations. These findings highlight the need to consider further research on the potential adverse effects of high iodine before new widespread iodine supplementation programs are begun.